

Amendment under 37 C.F.R. § 1.111
Application No. 10/054,898
Attorney Docket Q67951

REMARKS

General remarks.

Claims 50-52, and 57-61 are all the claims pending in the application. Claim 45 being cancelled, claim 50 has been rewritten independent form.

Objection to the specification.

Applicant notes the Examiner's objection to page 29 of the specification. Applicant did not find the text pointed out by the Examiner on page 29, but thinks the Examiner must have meant page 30. This correction is included in the above changes to the specification. In view thereof, Applicant respectfully requests the Examiner to withdraw this objection.

Objection to the drawings.

Applicant respectfully requests the Examiner to withdraw the objection to the drawings in view of the enclosed Proposed Drawing Correction.

Prior art rejections.

The Examiner rejected claims 45, 52, 53, and 56 under 35 U.S.C. § 102 as being anticipated by Nagasaki. The Examiner rejected claims 50, 51, 54, and 55 under 35 U.S.C. § 103(a) as being unpatentable over Nagasaki in view of Mitchell.

Since claims 45 and 53-56 have been cancelled, that much of this rejection is moot.

Applicant now analyzes whether any of the now-pending claims 50-52 and 57-61 would have been rendered obvious by the combined teachings of Nagasaki and Mitchell.

Independent claim 50, as now amended, is respectfully submitted to be patentably distinguishable over Nagasaki in view of Mitchell. Fig. 6 of Mitchell shows a septum 17, but does not teach or suggest a protruding member contacting the second member which is in the ink channel.

Even combining the teachings of Nagasaki and Mitchell, the combined arrangement would not meet this requirement, nor would it achieve the benefits of the invention as claimed. Mitchell is completely silent as to a protruding member contacting any second member contained in the ink channel.

The claimed invention, however, provides for a protruding member (see, e.g., the protruding rim 34 in Applicant's Fig. 2) with a first member (packing member 8 in this example) so that it can efficiently achieve an ink sealing by contacting the second member (valve member 10 in this example). That is, the protruding member elastically abuts against the ink supply needle when the ink channel is established, and elastically abuts against the second member when the ink channel is closed. Because of the elastic abutment, an ink supply system can efficiently and effectively provide ink to a printing head through the needle with less effort while maintaining proper ink sealing.

In view of these points, Applicant respectfully submits that claim 50 patentably distinguishes over Nagasaki and Mitchell, taken as a whole for what they would have meant to an artisan of ordinary skill.

New independent claim 57 is respectfully submitted to patentably distinguish over Nagasaki, Mitchell, and any other prior art in view of its requirement for a sealing member that closes the ink channel in an airtight manner until the ink channel is open.

Independent claim 58 is patentable in view of its requirement that the surface of the second member that faces the packing member is equipped with a notch.

Independent claim 59 is patentable over the prior art in view of its requirement that the second member has a guide body that allows it to slide substantially vertically with respect to the packing member.

Independent claim 60 distinguishes over the prior art in view of its requirement that the second member has a guide rod and guide unit as mentioned in the claim.

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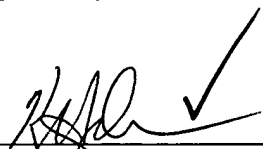
Independent claim 61 distinguishes over the prior art in view of its requirement that the direction of the ink channel is substantially the same direction in which the first member seals with the second member.

Conclusion and request for telephone interview.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,



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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

The specification is changed as follows:

Page 2, line 1.

When the ink cartridge includes a porous member within its ink chamber for absorbing ink, the ink chamber is depressurized by the porous member. Therefore, the ink cartridge needs to be sealed so as not to undesirably suck air or bubbles in the ink chamber.

Page 2, line 20.

When the ink cartridge 112 is removed from the printing apparatus with ink left therein, the sealing of the ink supply needle 118 with the packing member 120 is released. The result is that ink leaks from the ink supply port 114 or that air or a bubble enters the ink supply port 114. [It] This means that a user of the ink cartridge cannot remove the ink cartridge until ink in the ink cartridge is completely used up. The user cannot repeatedly exchange a plurality of ink cartridges with his choice while ink still remains [is still remained] in the ink cartridge.

Page 4, line 7.

In the conventional ink cartridge shown and Fig. 28, the packing member 134 serves as a valve seat sealing the ink supply port 132 with the connecting means, and the ball 136 serves as a valve body closing the ink supply port 132 in cooperation with the packing member 134. However, the relative position between the ball 136 and the spring 138 is unstable. This may cause an undesirable insufficient sealing by the ball 136 with the packing member 134. Furthermore, the connecting means needs to have a large contact area to sufficiently urge the ball 136 against the elastic force of the spring. Therefore, the connecting means is [does] not easily inserted in the packing member 134. Furthermore, because the ball 136 is always urged toward

the packing member 134 by the spring, the through hole of the packing member 134 may be expanded. This is disadvantageous because it may cause an insufficient connection between the ball 136 and the packing member 134.

Page 5, line 10.

The above and other objects can be achieved by combinations of the features recited in independent claims of the present application. Dependent claims define further advantages and exemplary combinations of the present invention.

Page 19, line 14.

Preferred embodiments of the present invention will now be described in detail with reference to the accompanying drawings. The embodiments described as follows [do not intend] are not intended to limit the scope of the present invention, but merely exemplify the invention. [All] Not all of the features and the combinations thereof described in the embodiment are [not] necessarily essential to the invention.

Page 19, beginning at line 21 and extending to page 20.

Fig. 1 shows a first embodiment of an ink cartridge according to the present invention. As shown and Fig. 1, an ink cartridge 2 has an ink chamber 4 for containing ink, and an ink supply port 6 designed to establish an ink communication with the ink chamber 4. The ink cartridge 2 is also provided with a packing member 8 disposed within the ink supply port 6, and a valve member 10 located between the ink chamber 4 and the packing member 8. The valve member 10 is always urged toward the packing member 8 by an elastic force of a compression spring 12 (see figure 2). The packing member 8 is made of an elastic material such as a rubber or a plastic. The ink chamber 4 accommodates therein a porous member 5 which absorbs ink. Because of the fact that ink is absorbed in the porous member 5, ink is retained in the ink chamber in a stable manner without splashing, even [when] with the ink cartridge being mounted on a carriage of a printing apparatus [moves in reciprocate] reciprocating at a high speed. Since

[As] the porous member 5 is accommodated in the ink chamber 4, the ink chamber 4 is always depressurized.

Page 22, line 13.

The packing member 8 is press-fitted in the ink supply port 6 and defines an ink introducing chamber 36 within the ink supply port 6. The ink introducing chamber 36 is an area defined between the packing member 8 and the ink chamber 4. The valve member 10 [4] is received in the ink introducing chamber 36. The ink introducing chamber 36 has a cylindrical guide unit 38 having a through bore 38a. The guide unit 38 receives a part of the valve member 10 in order to guide the valve member 10. The guide unit 38 contacts with the part of the valve member 10 necessary to have the valve member 10 moved vertically with respect to the packing member 8. The valve member 10 is always urged by a compression spring 12 toward the packing member 8, to contact with the packing member for selectively closing the ink channel of the packing member 8.

Page 24, line 14.

The internal opening 16 formed at the side of the ink supply port 6 opening to the ink chamber 4 has a dimension larger than the dimension of the ink introducing chamber 36 in which the valve member 10 is accommodated. The result is, ink can smoothly be introduced to the ink introducing chamber 36, and can likewise smoothly flow [flown] to the ink supply port 6 and the ink chamber 4 of the ink cartridge. A filter 54 is provided between the internal opening 16 of the ink supply port 6 and the ink chamber 4 of the ink cartridge. The filter 54 collects dust or foreign particles existing in the ink chamber 4. Furthermore, as the filter 54 has a dimension the same as that of the internal opening 16, ink passes smoothly through the filter 54.

Page 25, line 15.

As shown in Fig. 4(A), the external opening 14 of the ink supply port 6 is adjusted to fit the ink supply needle 104 to have the ink cartridge 2 depressed in the ink cartridge holder 106 of the printing apparatus. The tapered ink supply needle 104 then penetrates the sealing film 56, to

be inserted into the fitting portion 28 whilst being guided by the first and second tapered portions 24 and 26 of the packing member 8. When the ink cartridge 2 is further pushed into the cartridge holder 106 of the printing apparatus, the tapered ink supply needle 104 is smoothly inserted into the hole 32 of the packing member 8. This causes the hole 32 to expand, and the fitting portion 28 of the packing member 8 seals the ink supply needle 104 (see figure 4(B)). The ink supply needle 104 urges the flat sealing portion 44 of the valve member 10 upward. At the same time, the valve member 10 moves toward the ink chamber 4 against the elastic force of the compression spring 12.

Page 30, line 6.

In this embodiment, the valve member 10 is incorporated in the ink supply port 6 by entering the compression spring 12 from the internal opening 16 to be placed around the ink introducing chamber 36. The edge of the guide body 42 having the groove 62 is pushed into the through bore 38a of the guide unit 38. The guide block 52 has a groove 62 which allows the guide block 52 to be buckled as it passes through the through bore [38] 38a, and then spreads to be retained in the guide unit 38. In this case, the valve member 10 can be formed as one unit, therefore, the number of parts and working process are reduced.

Page 31, line 20.

As for the ink cartridge 2 according to the present invention, the ink of the ink supply port 6 is sealed by the connection between the packing member 8 and the valve member 10. Thus, it is not necessary to close the external opening 14 with a sealing film or any equivalent member thereof. Therefore, as shown in Figs. 13(A) and 13(B), the sealing film 56 provided at the external opening 14 may be formed with a hole 56a which enables the ink supply needle 104 to pass through. The hole may be formed by cutting the film in a cross shape as shown in Fig. 14. By making the hole, the ink supply needle smoothly passes [pass] through the film.

IN THE CLAIMS:

Please cancel claim 45 and 53-56, without prejudice or disclaimer.

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The claims are amended as follows.

50. (Amended) [An ink supply system according to claim 45,] An ink supply system for a printing apparatus providing ink to a printing head through a tapered ink supply needle, said ink supply system capable of providing ink contained in an ink chamber to the print head through the ink supply needle, comprising:

an ink channel for providing ink from said ink chamber to the print head of the printing apparatus;

a first member provided at said ink channel, forming a part of said ink channel for allowing a flow of ink, said first member sealing the ink supply needle of the ink printing apparatus by fitting therewith; and

a second member contained in said ink channel elastically abutting against said first member in a direction which is the same as a direction of the sealing by said first member with said second member, said second member selectively opening and closing said ink channel in conjunction with the ink supply needle;

wherein said first member [comprising] comprises a protruding [rim] member formed on a surface thereof facing the ink chamber [, said protruding rim formed on a surface thereof facing the ink chamber], said protruding [rim] member contacting the ink supply needle of the printing apparatus and said second member contained in said ink channel.

New claims 57-61 have been added.